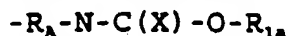


WHAT IS CLAIMED IS:

1. A compound comprising a plurality of linked nucleosides, wherein:

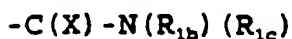
5 each nucleoside includes a ribofuranosyl sugar portion and a base portion; and

at least one of said nucleosides bears at a 2'-O-position or a 3'-O-position a substituent having formula:



10

or



where:

R_A is alkyl having from 1 to about 10 carbon atoms or $(CH_2-CH_2-Q)_x$;

15

R_{1a} is alkenyl having 2 to about 10 carbon atoms;

R_{1b} and R_{1c} , independently, are H, R_2 , R_A , an amine protecting group or have formula $R_A-N(R_{1d})(R_{1e})$, $C(X)-R_2$, $C(X)-R_A-R_2$, $C(X)-Q-R_A-R_2$, or $C(X)-Q-R_2$;

20

R_{1d} and R_{1e} , independently, are H, R_2 , R_A , an amine protecting group or have formula $C(X)-R_2$, $C(X)-R_A-R_2$, $C(X)-Q-R_A-R_2$, or $C(X)-Q-R_2$;

R_2 is a steroid molecule, a reporter molecule, a lipophilic molecule, a reporter enzyme, a peptide, a protein, includes folic acid, or has formula $-Q-(CH_2CH_2-Q)_x-R_3$;

25

X is O or S;

each Q is, independently, is NH, O, or S;

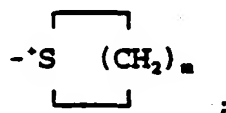
x is 1 to about 200;

R_3 is H, R_A , $C(O)OH$, $C(O)OR_A$, $C(O)R_4$, R_A-N_3 , or R_A-

30

NH_2 ;

R_4 is Cl, Br, I, SO_2R_5 or has structure:



35

m is 2 to 7; and

R_5 alkyl having 1 to about 10 carbon atoms.

2. The compound of claim 1 wherein more than one of said nucleosides bears said substituent at a 2'-O-position or a 3'-O-position.

3. The compound of claim 1 wherein R_A is alkyl having
5 1 to about 10 carbon atoms.

4. The compound of claim 1 wherein R_A is alkyl having 6 carbon atoms.

5. The compound of claim 1 wherein R_{1a} is alkenyl having 2 to about 10 carbon atoms.

10

6. The compound of claim 1 wherein R_{1a} is 2-propenyl.

7. The compound of claim 1 wherein R_{1b} is H and R_{1c} is H.

8. The compound of claim 1 wherein R_{1b} is H and R_{1c} is
15 R_2 .

9. The compound of claim 1 wherein R_{1b} is H and R_{1c} is alkyl having 1 to about 10 carbon atoms.

10. The compound of claim 1 wherein R_{1b} is H and R_{1c} is alkyl 1 or 2 carbon atoms.

20 11. The compound of claim 1 wherein R_{1b} and R_{1c} , together, are phthalimido.

12. The compound of claim 1 wherein R_{1b} is H and R_{1c} is $R_A-N(R_{1d})(R_{1e})$.

13. The compound of claim 12 wherein R_{1d} is H and R_{1e}
25 is R_2 .

14. The compound of claim 12 wherein R_{1d} is H and R_{1e} is alkyl having 1 to about 10 carbon atoms.

15. The compound of claim 12 wherein R_{1c} is H and R_{1a} is alkyl 1 or 2 carbon atoms.

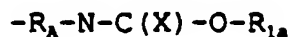
5 16. The compound of claim 12 wherein R_{1d} and R_{1e} , together, are phthalimido.

17. The compound of claim 12 wherein R_{1d} is H and R_{1e} is R_2 or $C(X)-Q-R_2$.

10 18. The compound of claim 17 wherein R_{1e} is $C(O)-O-R_2$.

19. The compound of claim 17 wherein R_2 includes cholesterol or folic acid.

20. A nucleoside comprising a ribofuranosyl sugar portion and a base portion, wherein said nucleoside bears at
15 a 2'-O-position or a 3'-O-position a substituent having formula:



or



20 where:

R_A is alkyl having from 1 to about 10 carbon atoms or $(CH_2-CH_2-Q)_x$;

R_{1a} is alkenyl having 2 to about 10 carbon atoms;

25 R_{1b} and R_{1c} , independently, are H, R_2 , R_A , an amine protecting group or have formula $R_A-N(R_{1d})(R_{1e})$, $C(X)-R_2$, $C(X)-R_A-R_2$, $C(X)-Q-R_A-R_2$, or $C(X)-Q-R_2$;

R_{1d} and R_{1e} , independently, are H, R_2 , R_A , an amine protecting group or have formula $C(X)-R_2$, $C(X)-R_A-R_2$, $C(X)-Q-R_A-R_2$, or $C(X)-Q-R_2$;

R_2 is a steroid molecule, a reporter molecule, a lipophilic molecule, a reporter enzyme, a peptide, a protein, includes folic acid, or has formula -Q-(CH₂CH₂-

5 Q-)_x-R₃;

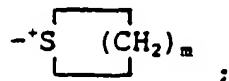
X is O or S;

each Q is, independently, is NH, O, or S;

x is 1 to about 200;

10 R₃ is H, R_A, C(O)OH, C(O)OR_A, C(O)R₄, R_A-N₃, or R_A-NH₂;

R₄ is Cl, Br, I, SO₂R₅, or has structure:



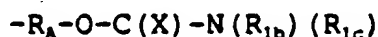
15 m is 2 to 7; and

R₅ alkyl having 1 to about 10 carbon atoms.

21. A compound comprising a plurality of linked nucleosides, wherein:

20 each nucleoside includes a ribofuranosyl sugar portion and a base portion; and

at least one of said nucleosides includes a pyrimidine base which bears at its 5-position a substituent having formula:



25 where:

R_A is alkyl having from 1 to about 10 carbon atoms or (CH₂-CH₂-Q)_x;

30 R_{1b} and R_{1c}, independently, are H, R₂, R_A, an amin protecting group or have formula R_A-N(R_{1d})(R_{1e}), C(X)-R₂, C(X)-R_A-R₂, C(X)-Q-R_A-R₂, or C(X)-Q-R₂;

R_{1d} and R_{1e}, independently, are H, R₂, R_A, an amine protecting group or have formula C(X)-R₂, C(X)-R_A-R₂, C(X)-Q-R_A-R₂, or C(X)-Q-R₂;

35 R₂ is a steroid molecule, a reporter molecule, a lipophilic molecule, a reporter enzyme, a peptide, a

protein, includes folic acid, or has formula $-Q-(CH_2CH_2-Q)_x-R_3$;

X is O or S;

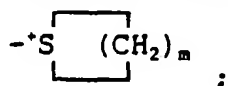
5 each Q is, independently, is NH, O, or S;

x is 1 to about 200;

R_3 is H, R_A , $C(O)OH$, $C(O)OR_A$, $C(O)R_4$, R_A-N_3 , or R_A-NH_2 ;

R_4 is Cl, Br, I, SO_2R_5 or has structure:

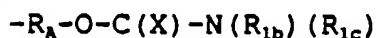
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m is 2 to 7; and

R_5 alkyl having 1 to about 10 carbon atoms.

15 22. A nucleoside comprising a ribofuranosyl sugar portion and a pyrimidine base portion, wherein said base portion bears at its 5-position a substituent having formula:



where:

20 R_A is alkyl having from 1 to about 10 carbon atoms or $(CH_2-CH_2-Q)_x$;

R_{1b} and R_{1c} , independently, are H, R_2 , R_A , an amin protecting group or have formula $R_A-N(R_{1d})(R_{1e})$, $C(X)-R_2$, $C(X)-R_A-R_2$, $C(X)-Q-R_A-R_2$, or $C(X)-Q-R_2$;

25 R_{1d} and R_{1e} , independently, are H, R_2 , R_A , an amin protecting group or have formula $C(X)-R_2$, $C(X)-R_A-R_2$, $C(X)-Q-R_A-R_2$, or $C(X)-Q-R_2$;

R_2 is a steroid molecule, a reporter molecule, a lipophilic molecule, a reporter enzyme, a peptide, a protein, includes folic acid, or has formula $-Q-(CH_2CH_2-Q)_x-R_3$;

30

X is O or S;

each Q is, independently, is NH, O, or S;

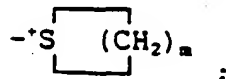
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x is 1 to about 200;

R_3 is H, R_A , $C(O)OH$, $C(O)OR_A$, $C(O)R_A$, R_A-N_3 , or R_A-NH_2 ;

R_4 is Cl, Br, I, SO_2R_5 or has structure:

5



m is 2 to 7; and

R_5 alkyl having 1 to about 10 carbon atoms.

23. A method for modulating the production of a
10 protein by an organism comprising contacting an organism with
a compound of claim 1.

24. A method for modulating the production of a
protein by an organism comprising contacting an organism with
a compound of claim 20.

15 25. A method for modulating the production of a
protein by an organism comprising contacting an organism with
a compound of claim 21.

26. A method for modulating the production of a
protein by an organism comprising contacting an organism with
20 a compound of claim 22.

27. A method of treating an animal having a disease
characterized by undesired production of protein comprising
contacting said animal with a compound of claim 1.

28. A method of treating an animal having a disease
25 characterized by undesired production of protein comprising
contacting said animal with a compound of claim 20.

29. A method of treating an animal having a disease
characterized by undesired production of protein comprising
contacting said animal with a compound of claim 21.

30. A method of treating an animal having a disease characterized by undesired production of protein comprising contacting said animal with a compound of claim 22.

31. A method for detecting the presence or absence of
5 an RNA in a biological sample suspected of containing said RNA comprising contacting said sample with a compound of claim 1.

32. A method for detecting the presence or absence of an RNA in a biological sample suspected of containing said
10 RNA comprising contacting said sample with a compound of claim 20.

33. A method for detecting the presence or absence of an RNA in a biological sample suspected of containing said RNA comprising contacting said sample with a compound of
15 claim 21.

34. A method for detecting the presence or absence of an RNA in a biological sample suspected of containing said RNA comprising contacting said sample with a compound of claim 22.